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but that is not by any means the sort of field in which coal is found.

In the first place, we all know that coal <sup>lies</sup> ~~is found~~ underground, in a mine. Suppose a coal master is going to open a new pit. He chooses a likely spot for coal, but at present, perhaps, sees nothing but a jerry commons. But geologists can tell, by the sort of rock which appears at the surface, whether coal is likely to be found underground.

The first thing is to bore a hole deep down into the earth <sup>by means of</sup> ~~with~~ a sort of chisel at the end of an iron rod. As the hole is not large enough for a man to follow the chisel, it is driven by a machine. This boring tool is so contrived that part of it can be drawn up every now & then with a bit of the ground it is working through, so that the men at the top may see whether it is going through grit, or clay, or coal. If the boring tool brings up coal often, the coal master <sup>knows</sup> that he has found a good place for his pit.

This is how it is: in a coal field the coal lies in a number of layers or strata, separated from one another by layers of silty clay, called shale, or coarse, hard sand-stone called grit, forming altogether what are known as coal measures. That is, beds of sand-stone, shale, clay, & coal, lie one below another, some below another to a great depth.

The layers of coal called seams, are generally thin. They are wide enough, stretching under a great piece of country, but are often only a few inches deep, & are hardly ever more than the height of a man in thickness. The

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The beds of grit & shale between the coal-seams are much thicker than the coal itself. Many different seams of coal lie however, under one another at the same spot.

When the coal-master has found a coal-measure with a good many seams of coal, the next thing is to sink a shaft. A shaft is a hole deep enough to reach a good thick coal-seam, wide enough <sup>to allow</sup> for men, horses, carts, & the covered to the coal.

When the miners reach a thick seam, they drive a broad passage through it reaching from top to bottom, from roof to floor. This is called the mother-gate: gate is the north-country word for a road or way, & this is the mother gate, along many passages are driven from it on either side. When all the gates have been driven, the coal-mine looks something like a town with many streets, some wide & some narrow, with great pillars of coal here & there like <sup>buildings</sup> ~~the coal pits~~. The miners are lowered into the deep darkness of this underground town darkness so black, that the darkest night would seem bright compared with it. All the light they have is from the candle or little lamp which each man carries in his hat. Every man has his own place in the mine, & each sets to work with his pick to hew out the walls of coal. The coal is thrown into baskets, which are drawn along tramways to the great shaft. There it is put into waggons which an engine raises to the surface.

The colliers often work in galleries so low & narrow that he cannot stand upright, or even sit but labours in

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a stopping posture for hours together, working by the  
flames of a small candle, <sup>which is carried in his cap,</sup> five or six hundred feet  
down in the bowels of the earth. After he must  
make his way through a mile or two of winding (or round)  
passages to get to his work.

It is this all: the roof of this gloomy workshop  
may break in & crush him. The earth's crust  
is always pretty full of water, the water which  
soaks in after every rain; though engines  
are kept at work to pump it up & keep the  
pits dry, & sudden rush of water may  
burst through at any time, fill the galleries,  
& drown the miners. The air, too, is close & bad  
in these deep pits, often bad enough to poison  
a man, though great pains are taken to keep  
it moving in such a way as to make a  
constant draught right through the mine.

There is another danger more terrible than  
these. In an instant, in the most fearful  
manner, the mines may be scorched & shrivelled  
to a blackened mass, or shattered to pieces  
against the sides of the mine; - In a great pit  
may break out suddenly & fill the pit with  
death.

We all know that the gas with which our houses  
are lighted is made from coal; & that if this  
gas is allowed to escape so as to fill a room, a  
lighted candle taken into such a room would  
set the house on fire.

Coal gives off a great deal of such inflammable  
gas in the pit. This gas mixes with the  
air, moves along with it; & this is why it is so  
necessary to keep a constant draught through  
the mine so that the gas should be carried to the  
shafts by which it <sup>may</sup> escape. Then, again, every



now when the collier lays open with his pick  
a hole in the coal which is quite full of this gas, or  
as the workmen call it, fire-damp, which rushes  
out with a blowing noise.

If a heaver with his lighted candle came in  
the way of such a blow, sending out a torrent  
of gas, the gas would blaze up, the flame would  
spread like lightning to the other gas all over  
the mine, & battered by the explosion & shrivel  
in the fierce heat, horses & men would come  
to a terrible end, from which there is no  
way of escape.

What is this precious coal upon which we depend  
not only for the working of our great mills but  
for help the comfort of our lives? A black stone, like  
mineral dust of the earth, you think. That  
is what it is now, certainly. But many many  
ages ago, when this <sup>Yokohama</sup> great coal field was  
there was an enormous forest of trees  
unlike any we have now, of huge tree-ferns  
& mosses, club-mosses, which grew to the  
height of fifty or sixty feet.

This great forest grew by the sea-side, (the sea came  
further in, in those days), & the land was slowly  
slowly sinking. Every now & then the <sup>land</sup> came  
is amongst the trees, & went out again, & came  
much sand behind it. And this went on so  
long that the forest was buried in sand. As  
ages went on, the sand grew deep on the top of the  
old forest. Soil gathered on the sand, & another  
forest grew on the place of the first - only to be  
buried again in its turn.

During countless ages thus from the recovery  
up & down, until, in some places, as many  
as a hundred forests ~~up & down~~ grew in the  
course

conceal pages over one another.

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After the trees had been long buried, changes began to take place. The mass heated & turned black, just as a pile of hay does now when it has been packed in a damp state. By and by it was changed into a sort of pulp, so that you could not tell leaves from branches. At last it became hard, & black, & bright, the very coal <sup>we</sup> ~~you~~ know so well.

And in the coal measures you may see the seams of coal, each one of which <sup>was</sup> ~~was~~ an ancient forest, - & the sand, <sup>become</sup> ~~become~~ hard, sandstone pit - which buried up the forests one after another, & the clay, in which each new forest <sup>grew</sup> ~~grew~~. Another very curious thing is, that in the Yorkshire coal fields the miners find a great deal of what they call "fish-coal" - that is, coal marked with the bones or containing the fossil shells of fishes. The reason of this is plain enough; when the sands buried the trees, they buried amongst them the fishes that had been brought in by the tide. These came to light again after long ages. Like little <sup>at</sup> ~~little~~ fish <sup>shell</sup> ~~fish~~ <sup>formed in</sup> ~~out of~~ <sup>of</sup> ~~them~~.

### The Clothing Town. Bradford.

Ranking next to Leeds as a clothing town is Bradford - which has long been known as the 'metropolis of woollen'; but ~~now~~ <sup>now</sup> ~~as the metropolis of woollen~~ <sup>as the metropolis of woollen</sup> ~~was Bradford~~ <sup>was Bradford</sup> ~~has a rather harsh sound~~ <sup>has a rather harsh sound</sup> ~~as Bradford~~ <sup>as Bradford</sup> makes every sort of soft & roller of material, perhaps it is better to say, that all woollen goods which are not-felted or fulled after being woven are made here.

The town lies in a valley amongst the rolling hills.

hills which lie between the Aire & the Calder: & rather the heart of the town is in the valley, but you cannot get into any of the pleasant-

suburbs, or even into the best streets of shops without going up hill. From any hill-side round the town you may see Bradford lying in the hollow. The houses thickly clustered, & church steeples here & there, & small chimneys - something like two hundred of them - rising everywhere, sometimes scattered far apart & sometimes gathered together by the score. That is, you can see all this if the smoke from these tall chimneys does not hang so heavy over the town that there is no view to be had.

The hills in the midst of which Bradford lies are composed of good building stone & many an open quarry scars their sides. Therefore Bradford is built of stone & is, for the reason, a much handsomer town than of red brick, which is apt to get dingy & shabby, were the material used in its building.

There is a fine town-hall, with a tall bell-tower from which pleasant tones are heard upon the evening air, <sup>as well as</sup> ~~there are~~ a good many other handsome public buildings. And there with the streets of tall well-built warehouses & the <sup>well-spread</sup> shops in the town, & the pleasant villas of the merchants & manufacturers on its outskirts, give Bradford a 'well-to-do' appearance.

We have no space to describe the excellent schools & other places of education, the libraries, the Blind Institute, nor any of the excellent schemes for the education of the people & the aid of the unfortunate which here, as in Leeds & in other Yorkshire towns, speak well for the public spirit



Spirit, ~~generosity~~, ~~good sense~~ ~~strenuousness~~ of heart wisdom of the towns people.

In Bradford, as in Leeds the mills are the most unrightly building of the town, but they are, at the same time, the most interesting. Here we made the merceries, <sup>appears</sup> & soft dress stuffs with many names manufactured for ladies dresses. <sup>willow cloths for</sup> ~~their~~ jackets & braid for trimming. <sup>with other materials</sup> ~~also~~ <sup>and</sup> will nothing less than silks, & velvet & satins do for you? Even then you may get everything you want of Bradford make of very excellent quality.

The 'Manningham Mill' - a palace for silk <sup>around</sup> appearance. The largest manufacturing of the kind in England. Here some 3,000 hands are employed, produces silk velvet goods of every kind; and most curious & interesting as all the processes through which the delicate web of the silkworm goes before it passes into the hands of the dressmaker. But we have no space to describe this very important manufacture.

The work people themselves interest us more. After all, how ~~at~~ the wonderful machinery of the mills; the "mill-hands" <sup>the best kind of</sup> of Yorkshire are pleasant folk to know. They have as comfortable homes as any work people in England when they are sober, industrious, clean & careful. <sup>in their houses</sup> ~~They~~ <sup>have</sup> as comfortable a bright, pleasant living room, with a good chest of drawers & sofa, <sup>very</sup> likely, a piano in it, with ornaments & pictures, & sometimes a well-filled book case; while the inviting <sup>adorn</sup> ~~small~~ of Yorkshire "baking" shows that the family will not starve for a day or two at any rate. And it often happens that the father has paid into a building society until the house he lives in is his own.

Bradford

Bradford is not a town with a very interesting history. <sup>During</sup> In the days of the Civil War (1642-1649), when the King, Charles I., & the Parliament took up arms against each other, & almost every town in the Kingdom sided with one party or the other, Bradford was on the side of the Parliament. The King's army under the Earl of Newcastle attacked the town, & the parish church was used as an hospital for the wounded, the townsmen hitting on a clever device of hanging wool-picks round the tower to receive the shot of the enemy.

Yorkshire was, for the most part, on the King's side, but the motto Fairfaxes, Lord Fairfax & his son, Sir Thomas, who belonged to an ancient Yorkshire family, fought valiantly against the royal force under the Earl of Newcastle. Sir Thomas Fairfax has left an account of the actions in which he & his father were engaged, containing interesting facts with regard to towns of Leeds & Bradford.

### The Narratives of Sir Thomas Fairfax.

'We being at Leeds, it was thought fit to  
proceed some





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These men I had brought from Kalijah. I found  
my father much troubled, having neither a place of  
strength to defend ourselves in, nor a garrison in  
Yorkshire to retreat to, for the governor of Hull had declared  
York was forced to retreat thither, he would shut the gates  
on us. But we got a friendly message from the townsmen,  
"My father having ordered me to stay here, (in Bradford),  
retired that night to Leeds to secure it."

"The earl of Newcastle spent three or four days in Coping  
his quarters about the town of Bradford; & brought  
down his cannon, but needed not to raise  
batteries, for the hills commanded all the town.  
Being planted in two places, they shot furiously  
upon us, which made us spend very much of our  
little store of powder at the beginning of the siege."

"After some very hot fighting, we had not above  
one barrel of powder left. A match: I called the  
officers together, it was resolved to draw off  
presently before it was day, & to retreat to Leeds by  
going a way, which we must do, for they had surrounded  
the town."

"Orders were given & soon put in execution. My  
foot (soldiers) was sent out through some narrow  
lanes, & I myself went with the horse & foot, in  
a more open way."

"I must not here forget my wife, who ran the same  
hazard with us in this retreat, without saying  
anything of her fears: not because she took  
pleasure in war, but because she was patient  
in hearing that could not be helped."

"The day beginning to break, I saw upon the hill  
above us about 300 horse of the enemy. Myself  
& three more broke through, but the enemy fell  
upon the rest & soon routed them, taking most  
of